Claims

1. A genetically-modified, non-human mammal, wherein the modification results in a functionally disrupted phosphodiesterase 11A (PDE11A) gene.

2. The mammal of claim 1, wherein said mammal is a rodent.

3. The rodent of claim 2, wherein said rodent is a mouse.

4. A genetically-modified animal cell, wherein the modification comprises a functionally disrupted PDE11A gene.

5. The animal cell of claim 4, wherein said cell is an embryonic stem (ES) cell.

6. The animal cell of claim 4, wherein said cell is human.

7. The animal cell of claim 4, wherein said cell is murine.

8. A method of identifying an agent that modulates spermatogenesis, said method comprising: contacting an agent with a PDE11A polypeptide and measuring PDE11A activity, wherein a difference between said activity in the absence of the agent and in the presence of the agent is indicative that the agent can modulate spermatogenesis.

9. The method of claim 8, wherein said agent inhibits PDE11A activity and is identified for use in decreasing spermatogenesis.

10. A method of identifying an agent that modulates spermatogenesis, said method comprising: contacting an agent with a cell that expresses a PDE11A polypeptide and measuring PDE11A activity or PDE11A expression, wherein a difference between said activity or expression in the absence of the agent and in the presence of the agent is indicative that the agent can modulate spermatogenesis.

11. A method of modulating spermatogenesis in a mammal, said method comprising administering an agent that modulates PDE11A activity.

12. The method of claim 11, wherein said agent reduces PDE11A activity and reduces spermatogenesis.

13. The method of claim 12, wherein said agent is UK-336,017 (IC-351), UK-227,786 (E4021), or UK-235,187.

14. A method of modulating cAMP and/or cGMP-mediated signal transduction in a mammal in testis, prostate, pituitary gland, bladder urothelium and/or bladder nerve fibers, neurons, skeletal muscle, cardiac myocytes, vascular smooth muscle, and/or vascular endothelial cells, said method comprising administering an agent that modulates PDE11A activity.

15. The method of claim 14, wherein said agent is UK-336,017 (IC-351), UK-227,786 (E4021), or UK-235,187.

16. A method of treating hypertension, cardiac insufficiency, atherosclerosis, hyperprolactinemia, growth hormone insufficiency, incontinence, or disorders associated with skeletal muscle metabolism or contractility, said method comprising administering an agent that modulates PDE11A activity.

17. The method of claim 16, wherein said agent is UK-336,017 (IC-351), UK-227,786 (E4021), or UK-235,187.

18. A method of detecting the modulation of spermatogenesis in a mammal, said method comprising measuring the expression of the biomarker Corticosteroid binding globulin, Centrin 3, XRCC1, Chromobox M33, GABA-A (gamma 3 sub-unit), Prohormone convertase 5, Leydig Insulin-like peptide, Calpain 3, Y-Box 3, Chromogranin B, Cryptdin I, PP2B, Glutamate cysteine ligase, Nidogen, HR6A, Protamine 1, sp32, mCDC46, Adenylate kinase 2, AKAP121 and/or Krox-24 binding

protein in the testis of said mammal, wherein an upregulation or a downregulation in biomarker expression indicates modulated spermatogenesis.

19. The method of claim 18, wherein said method detects reduced spermatogenesis by measuring an expression decrease in the biomarker Corticosteroid binding globulin, a decrease in the biomarker Centrin 3, a decrease in the biomarker XRCC1, a decrease in the biomarker Chromobox M33, a decrease in the biomarker GABA-A (gamma 3 sub-unit), a decrease in the biomarker Prohormone convertase 5, a decrease in the biomarker Leydig Insulin-like peptide, a decrease in the biomarker Calpain 3, a decrease in the biomarker Y-Box 3, a decrease in the biomarker Chromogranin B, a decrease in the biomarker Cryptdin I, a decrease in the biomarker PP2B, a decrease in the biomarker Glutamate cysteine ligase, a decrease in the biomarker Nidogen, a decrease in the biomarker HR6A, an increase in the biomarker Protamine 1, an increase in the biomarker sp32, an increase in the biomarker mCDC46, an increase in the biomarker Adenylate kinase 2, an increase in the biomarker AKAP121, and/or an increase in the biomarker Krox-24 binding protein.

20. A method of detecting the modulation of cAMP and/or cGMP signal transduction in a mammal, said method comprising measuring the expression of the biomarker Corticosteroid binding globulin, Centrin 3, XRCC1, Chromobox M33, GABA-A (gamma 3 sub-unit), Prohormone convertase 5, Leydig Insulin-like peptide, Calpain 3, Y-Box 3, Chromogranin B, Cryptdin I, PP2B, Glutamate cysteine ligase, Nidogen, HR6A, Protamine 1, sp32, mCDC46, Adenylate kinase 2, AKAP121 and/or Krox-24 binding protein in the testis, prostate, pituitary gland, bladder, urothelium and/or bladder nerve fibers, neurons, skeletal muscle, cardiac myocytes, vascular smooth muscle, and/or vascular endothelial cells of said mammal, wherein an upregulation or a downregulation in biomarker expression indicates modulated cAMP and/or cGMP signal transduction in said mammal.